Lauren Watson

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Education

2018-present **PhD Computer Science**, School of Informatics, University of Edinburgh
- Topic: Privacy Preserving Machine Learning.
- Leveraging insights from learning theory to improve the privacy-utility trade-off in private ML.

2018 **MSc Artificial Intelligence**, University of Edinburgh (***Distinction***)
- Thesis(81%): *What is Multi-Task Learning actually learning? An investigation into the effects of Multi-Task Learning for Sequence-to-Sequence Neural Models of Morphology.*
- IBM Shortlist for best Machine Learning Practical project (top 7 from >150 projects).
- Thesis listed as one of the year's 'outstanding' dissertations (out of 400+ students).
- Work included use of CNNs, LSTMs, RNNs, Regression, SVMs, Tensorflow, Keras and Scikit-learn.

2016 **BA Mathematics**, Trinity College Dublin (***First Class Honours***)
- Thesis (73%): *Bayesian Inference for Stochastic Volatility Models*. Included simulations in R.
- Relevant modules: Statistical Inference(89%), Applied Linear Models(84%) Advanced Calculus(75%).

Experience & Leadership

2021 **Research Intern**, Meta AI - Private Machine Learning (PriMaL)
- Resulted in first-author ICLR publication based on a large empirical study of privacy attacks on machine learning (PyTorch).

2018-20 **Teaching Support,** University of Edinburgh (Teaching Assistant, Tutor, Lab Demonstrator, Marker)
- Accelerated Natural Language Processing (2018-2021).
- Natural Language Understanding, Generation and Machine Translation (2018-2020).
- Machine Learning Theory (2022)
- Also: Data-driven Business and Behaviour Analytics (2020), Social and Technological Networks (2018), Introduction to Algorithms & Data Structures (2019).

2017-18 **Secretary,** University of Edinburgh Machine Learning Society (EdIntelligence)
- Key events manager for several successful events including a Machine Learning/AI Careers Fair attended by 400+ students over 2 days.

2013-15 **Chief Risk Officer,** Trinity Student Managed Fund
- Student investment fund (300+ students) with assets of ~€40,000 (now over €150,000).
- Proposed, created and managed the first ever fund Risk Department of 12 risk analysts.
- Developed a statistical risk modelling framework for the fund.
- Key member of the investment and operations committees during years that saw our investment capital grow by 24% and membership by 50%.

2012-13 **Consumer Staples Analyst**, Trinity Student Managed Fund

2012-13 **Treasurer**, Trinity College French Society.

Publications & Manuscripts

- L. Watson, C. Guo, G. Cormode, A. Sablayrolles, ***On the Importance of Difficulty Calibration in Membership Inference Attacks***, International Conference on Learning Representations (ICLR) 2022
- L. Watson, A. Mediratta, T. Elahi & R. Sarkar, ***Privacy Preserving Detection of Path Bias Attacks in Tor,*** Proceedings on Privacy Enhancing Technologies (PETs) 2020.
- L. Watson, B. Rozemberczki, A. Ghosh, R. Sarkar, ***Continual and Sliding Window Release for Private Empirical Risk Minimization,*** Preprint 2021.
- L. Watson, B. Rozemberczki, R. Sarkar, ***Stability Enhanced Privacy and Applications in Private Stochastic Gradient Descent***, Preprint 2020.
- B. Rozemberczki, L. Watson, P. Bayer, H. Yang, O. Kiss, S. Nilsson, R. Sarkar, ***The Shapley Value in Machine Learning,*** Preprint 2022.

Other Relevant Skills

Preferred*:* Python, PyTorch, Numpy, Pandas, Matplotlib.

Previously: Tensorflow, Scikit-learn, SciPy, Keras, NLTK, Java, R, C++, Ruby, Javascript, SQL, Matlab, Slurm